Air Quality in Alberta
January to March, 1999

Alberta Environment continuously monitors air quality in Edmonton (three stations), Calgary (three stations), Fort Saskatchewan and Beaverlodge (35 km west-northwest of Grande Prairie). Air quality parameters monitored at Alberta Environment stations include carbon monoxide, dust and smoke, oxides of nitrogen, ozone, total hydrocarbons, hydrogen sulphide, sulphur dioxide, carbon dioxide, ammonia and particulates (PM_{10} and $PM_{2.5}$). The Index of the Quality of the Air (IQUA) is calculated at the Edmonton, Calgary and Fort Saskatchewan stations. The IQUA converts air parameter concentrations into ***Good***, ***Fair***, ***Poor*** and ***Very Poor*** air quality ratings.

Highlights

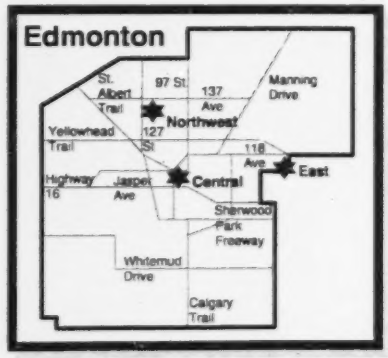
- ***Air quality was Good at least 96 per cent of the time in the first quarter of 1999 at all monitoring stations.*** The frequency of ***Good*** air quality ranged from 96.5 per cent at the Edmonton East station to 100 per cent at the Edmonton and Calgary Central stations.

- ***Air quality was better or close to the same as the 10-year average (1989 to 1998) at most monitoring stations.*** The only exception was the Edmonton East station where ***Good*** air quality was reported 96.5 per cent of the time compared to the 10-year average of 99.5 per cent.

- ***Poor and Very Poor air quality were not reported at any monitoring stations from January to March 1999.***

- ***Carbon monoxide and dust and smoke levels were lower than the 10-year average at most stations.*** Carbon monoxide concentrations were from 21 to 33 per cent lower than the average from 1989 to 1998 at Calgary and Edmonton monitoring stations. Dust and smoke levels were substantially lower than the 10-year average at all Edmonton stations (30 to 52 per cent lower) and at the Calgary Central station (22 per cent lower). The most common sources of carbon monoxide and dust and smoke at urban locations are vehicle exhaust emissions. Lower concentrations of pollutants emitted by automobiles were due to decreased emissions from more efficient automobiles.

- ***The one-hour guidelines for carbon monoxide and nitrogen dioxide were not exceeded at Alberta monitoring stations in the first quarter of 1999.*** However, the eight-hour guideline for carbon monoxide was exceeded one time at the Calgary Central station on the evening of January 14. Elevated values at this time were caused by vehicle exhaust emissions during stagnant weather conditions (strong temperature inversion with light winds).



Air Quality Monitoring Station

For current air quality conditions call ***427-7273*** in Edmonton and ***250-2099*** in Calgary.

Alberta
ENVIRONMENT

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☞ ***Air quality guidelines for sulphur dioxide were not exceeded in the first quarter of 1999.*** The highest one-hour average sulphur dioxide concentration of 0.049 ppm was recorded at the Edmonton East monitoring station. This value is lower than the one-hour guideline for sulphur dioxide of 0.170 ppm.

☞ ***The one-hour guideline for hydrogen sulphide was exceeded at the Calgary East (twice) and Edmonton East (twice) monitoring stations.*** These exceedances were recorded at the Calgary East station on January 14 (from 4 to 5 a.m.) and February 12 (from 8 to 9 a.m.). The maximum hydrogen sulphide concentration was recorded on February 12 with a value of 0.013 ppm, which is slightly above the one-hour guideline of 0.010 ppm. The 24-hour guideline for hydrogen sulphide was also exceeded on February 12 at the Calgary East monitoring station. The one-hour guideline was exceeded at the Edmonton East station on February 4 (from 10 to 11 p.m.) and March 2 (from 10 to 11 a.m.). Elevated hydrogen sulphide levels were likely caused by fugitive emissions, or leakages, from nearby industrial activities. Alberta Environment investigations determined no enforcement action was required.

☞ ***The one-hour guideline for ground-level ozone was not exceeded from January to March 1999.*** However, because of natural ozone in the atmosphere, the 24-hour guideline for ozone was exceeded frequently, especially in March, at rural monitoring stations. The highest number of exceedances of this guideline was recorded at the Beaverlodge station where the 24-hour guideline was exceeded on 68 days. In the winter and early spring, ozone is present naturally in the atmosphere because of transport from the ozone rich upper atmosphere to the ground level through normal atmospheric mixing. Lower ozone concentrations are recorded in the city cores because of the destruction of naturally occurring ozone by nitric oxide from vehicle exhaust emissions. Because of high natural levels, the 24-hour guideline for ozone is currently under review by a federal-provincial committee.

Number of Times Air Quality Guidelines were Exceeded - January to March, 1999

Station	Carbon Monoxide		Dust and Smoke	Hydrogen Sulphide		Nitrogen Dioxide		Ozone		Sulphur Dioxide	
	1-hour	8-hour	monthly	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour	1-hour	24-hour
Edmonton Central	0	0	0	n/a	n/a	0	0	0	11	n/a	n/a
Edmonton Northwest	0	0	0	n/a	n/a	0	0	0	11	n/a	n/a
Edmonton East	0	0	0	2	0	0	0	0	41	0	0
Calgary Central	0	1	0	n/a	n/a	0	0	0	5	n/a	n/a
Calgary Northwest	0	0	0	n/a	n/a	0	0	0	22	n/a	n/a
Calgary East	0	0	0	2	1	0	0	0	5	0	0
Fort Saskatchewan	0	0	0	0	0	0	0	0	43	0	0
Beaverlodge	n/a	n/a	n/a	n/a	n/a	0	0	0	68	0	0
Guideline	13 ppm	5 ppm	90% of values< 1 COH unit	0.01 ppm	0.003 ppm	0.21 ppm	0.11 ppm	0.082 ppm	0.025 ppm	0.17 ppm	0.06 ppm

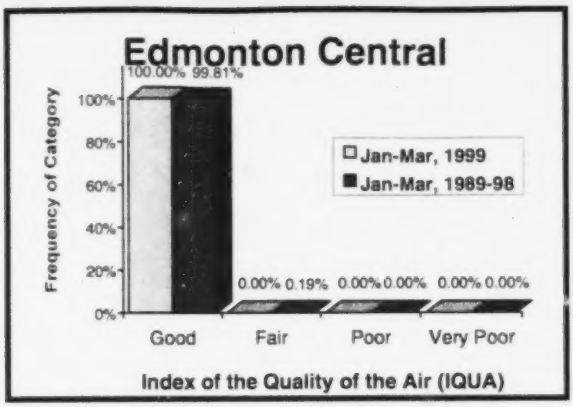
n/a Parameter not monitored or data not available.

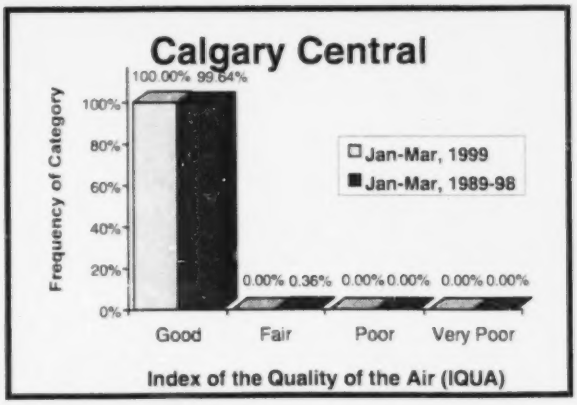
The Index of the Quality of the Air

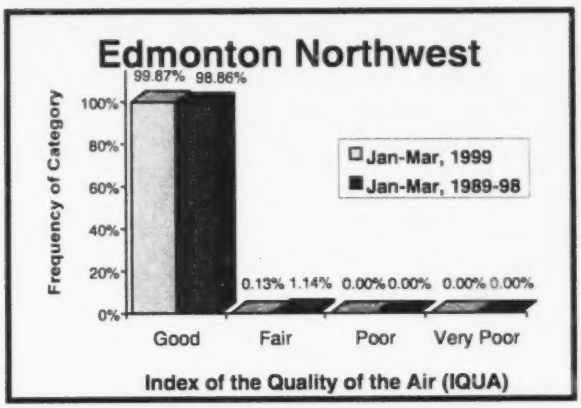
The index of the quality of the air (IQUA) provides the public with a meaningful measure of outdoor air quality. The IQUA is calculated every hour at all Edmonton, Calgary and Fort Saskatchewan monitoring stations. From this index, we know whether the air quality is ***Good***, ***Fair***, ***Poor*** or ***Very Poor***. The air pollutants used to calculate the IQUA are carbon monoxide, dust and smoke, nitrogen dioxide, ozone and sulphur dioxide. ***Good***, ***Fair***, ***Poor*** and ***Very Poor*** air quality categories are directly related to guidelines under Alberta's Environmental Protection and Enhancement Act, and National Air Quality Objectives.

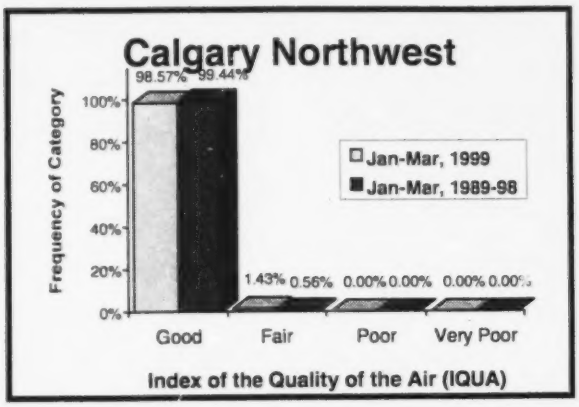
IQUA rating	Description
Good	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor	Tolerable range: not all aspects of the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor	Intolerable range: in this range, continued high readings could pose a risk to public health.

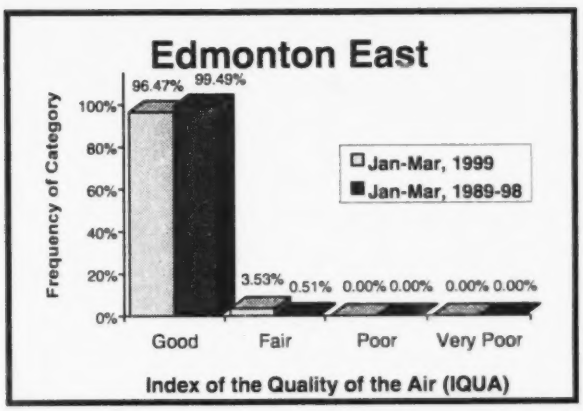
Source: Environment Canada. 1980. Guideline for a short-term air quality index. A report by the Federal-Provincial committee on Air Pollution.

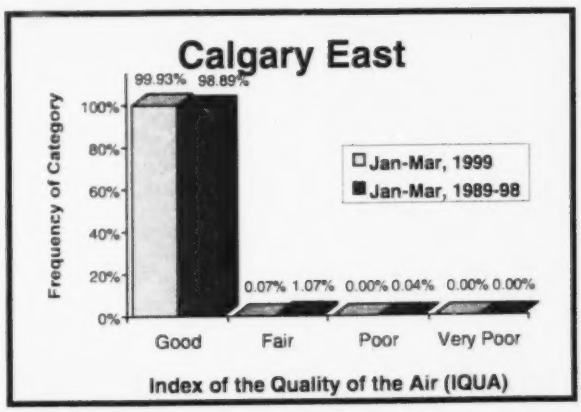

Edmonton Central
Frequency of Category
100%
80%
60%
40%
20%
0%
100.00% 99.81%
0.00% 0.19% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)

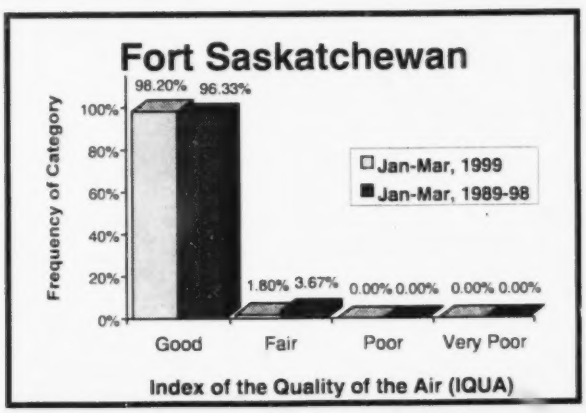

Calgary Central
Frequency of Category
100%
80%
60%
40%
20%
0%
100.00% 99.64%
0.00% 0.36% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Edmonton Northwest
Frequency of Category
100%
80%
60%
40%
20%
0%
99.87% 98.86%
0.13% 1.14% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Calgary Northwest
Frequency of Category
100%
80%
60%
40%
20%
0%
98.57% 99.44%
1.43% 0.56% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Edmonton East
Frequency of Category
100%
80%
60%
40%
20%
0%
96.47% 99.49%
3.53% 0.51% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Calgary East
Frequency of Category
100%
80%
60%
40%
20%
0%
99.93% 98.89%
0.07% 1.07% 0.00% 0.04% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)


Fort Saskatchewan
Frequency of Category
100%
80%
60%
40%
20%
0%
98.20% 96.33%
1.80% 3.67% 0.00% 0.00% 0.00% 0.00%
Jan-Mar, 1999
Jan-Mar, 1989-98
Good
Fair
Poor
Very Poor
Index of the Quality of the Air (IQUA)

Average Concentrations - January to March, 1999 [a]

Parameter	Monitoring Period	Edmonton Stations			Calgary Stations			Fort Saskatchewan	Beaverlodge
		Central	Northwest	East	Central	Northwest	East		
Carbon Monoxide	Jan-Mar 1999	0.95	0.88	0.48	1.00	0.64	0.97	0.55	n/a
(ppm)	Jan-Mar 1989-98	1.41	1.23	0.61	1.45	0.81	1.32	0.60	n/a
Dust and Smoke	Jan-Mar 1999	0.15	0.20	0.12	0.19	0.12	0.33	0.10	n/a
(COH unit)	Jan-Mar 1989-98	0.23	0.28	0.24	0.25	0.11	0.33	0.14	n/a
Hydrogen Sulphide	Jan-Mar 1999	n/a	n/a	0.001	n/a	n/a	0.001	0.000	n/a
(ppm)	Jan-Mar 1989-98 [b]	n/a	n/a	0.001	n/a	n/a	0.001	0.000	n/a
Nitrogen Dioxide	Jan-Mar 1999	0.032	0.032	0.025	0.037	0.023	0.032	0.019	0.007
(ppm)	Jan-Mar 1989-98	0.034	0.030	0.024	0.040	0.024	0.034	0.019	n/a
Ozone	Jan-Mar 1999	0.015	0.016	0.026	0.012	0.020	0.013	0.025	0.033
(ppm)	Jan-Mar 1989-98 [c]	0.013	0.015	0.020	0.011	0.020	0.013	0.023	0.028
Sulphur Dioxide	Jan-Mar 1999	n/a	n/a	0.004	n/a	n/a	0.004	0.003	0.002
(ppm)	Jan-Mar 1989-98 [d]	n/a	n/a	0.004	n/a	n/a	0.004	0.003	n/a
Total Hydrocarbons	Jan-Mar 1999	2.13	2.36	2.13	2.24	2.23	2.37	2.03	n/a
(ppm)	Jan-Mar 1989-98	2.51	2.27	2.41	2.30	2.13	2.29	2.14	n/a
Carbon Dioxide	Jan-Mar 1999	n/a	n/a	n/a	420	n/a	n/a	n/a	n/a
(ppm)	Jan-Mar 1992-97	n/a	n/a	n/a	409	n/a	n/a	n/a	n/a
Particulate	Jan-Mar 1999	n/a	17.6	14.0	30.1	n/a	n/a	n/a	n/a
(PM_{10} in $\mu g/m^3$)	Jan-Mar 1994-97 [e, f]	n/a	21.0	n/a	28.7	n/a	n/a	n/a	n/a
Particulate	Jan-Mar 1999	n/a	12.7	n/a	10.9	n/a	n/a	n/a	n/a
($PM_{2.5}$ in $\mu g/m^3$)	Jan-Mar 1998 [g]	n/a	n/a	n/a	12.9	n/a	n/a	n/a	n/a
Ammonia	Jan-Mar 1999	n/a	n/a	n/a	n/a	n/a	n/a	0.003	n/a
(ppm)	Jan-Mar 1989-98	n/a	n/a	n/a	n/a	n/a	n/a	0.004	n/a

a All average values based on data collected from January to March.

b Average hydrogen sulphide at the Edmonton East station for January to March 1991-1998.

c Average ozone for the Beaverlodge station is for January to March 1998.

d Sulphur dioxide monitoring began in February 1999 at the Beaverlodge station.

e Average PM_{10} at the Calgary Central station for January to March 1996-1998 and average PM_{10} at the Edmonton Northwest station for January to March 1994-1998.

f PM_{10} monitoring began in April 1998 at the Edmonton East station.

g $PM_{2.5}$ monitoring began in November 1997 at the Calgary Central station and in April 1998 at the Edmonton Northwest station.

n/a Parameter not monitored.